

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A fuel cell power plant which uses water for operation, comprising:
 - an antifreeze mechanism (~~15, 16~~) for preventing freezing of water in the fuel cell power plant; ~~[[and]]~~
 - a sensor which detects a parameter for estimating a freezing probability of water in the fuel cell power plant after operation of the fuel cell power plant stops; and
 - a programmable controller ~~[[30]]~~ programmed to:
 - estimate ~~[[a]]~~ the freezing probability of water in the fuel cell power plant after operation of the fuel cell power plant has stopped based on ~~[[a]]~~ the parameter ~~for estimating the freezing probability of water in the fuel cell power plant after operation of the fuel cell power plant stops~~ (~~S13, S52~~);
 - estimate a wait time from when the power plant has stopped operating based on the freezing probability (~~S16, S56~~); and
 - suspend operation of the antifreeze mechanism (~~15, 16~~) until the wait time has elapsed from when the fuel cell power plant stops operating (~~S18-S20, S55, S58-S61, S62, S63~~).
2. (Currently Amended) The ~~fuel cell~~ power plant as defined in Claim 1, wherein the controller is further programmed to set the wait time to be shorter as fuel cell power plant further comprises a sensor (2, 31) which detects a parameter for estimating the freezing probability increases of water in the fuel cell power plant after operation of the fuel cell power plant stops.
3. (Currently Amended) The power plant as defined in Claim 1 ~~or Claim 2~~, wherein the fuel cell power plant further comprises a sensor which detects the water temperature inside the fuel cell power plant, and the controller is further programmed to set the wait time to be longer as the water temperature when the fuel cell power plant stops operating rises ~~controller (30) is further programmed to set the wait time to be shorter as the freezing probability increases (S13).~~

4. (Currently Amended) The power plant as defined in Claim 1 ~~or Claim 2~~, wherein the controller is further programmed to operate the antifreeze mechanism after the wait time has elapsed ~~fuel-cell power plant further comprises a sensor (12) which detects the water temperature inside the fuel cell power plant, and the controller (30) is further programmed to set the wait time to be longer as the water temperature when the fuel cell power plant stops operating rises. (S13).~~

5. (Currently Amended) The power plant as defined in ~~Claim 1 or Claim 2~~ Claim 4, wherein the controller ~~[(30)]~~ is further programmed to update the freezing probability based on the parameter detected after the wait time has elapsed, and operate the antifreeze mechanism ~~(15, 16) only when an updated freezing probability exceeds a predetermined factor after the wait time has elapsed (S20, S63).~~

6. (Currently Amended) The power plant as defined in Claim 5, wherein the controller ~~[(30)]~~ is further programmed, when the updated freezing probability does not exceed the predetermined factor, to recalculate the wait time based on the updated freezing probability, re-update the freezing probability after the recalculated ~~to update the freezing probability based on the parameter detected after the wait time has elapsed [(S52)], and operate the antifreeze mechanism (15, 16) only when [[an]] the re-updated freezing probability exceeds [[a]] the predetermined factor [(S63)].~~

7. (Currently Amended) The power plant as defined in Claim 6, wherein the controller ~~[(30)]~~ is further programmed to predict a variation characteristic of freezing probability from a variation of the estimated freezing probability in the past, and correct the re-updated freezing probability based on the variation characteristic ~~when the updated freezing probability does not exceed the predetermined factor, to recalculate the wait time based on the updated freezing probability (S56), re-update the freezing probability after the recalculated wait time has elapsed (S52), and operate the antifreeze mechanism (15, 16) only when the re-updated freezing probability exceeds the predetermined factor (S63).~~

8. (Currently Amended) The power plant as defined in Claim ~~[[7]]~~ 4, wherein the power plant comprises a water recovery mechanism which recovers and stores part of the remaining

water when the power plant stops operating, and the controller [(30)] is further programmed to operate the water recovery mechanism before operating the antifreeze mechanism predict a variation characteristic of freezing probability from a variation of the estimated freezing probability in the past, and correct the re-updated freezing probability based on the variation characteristic (S52).

9. (Currently Amended) The power plant as defined in Claim [[5]] 1, wherein the power plant ~~comprises a water recovery~~ antifreeze mechanism (10, 14, 18, 20) comprises a drain valve which drains part of remaining water in the fuel cell power plant which recovers and stores part of the remaining water when the power plant stops operating, and the controller (30) is further programmed to operate the water recovery mechanism (10, 14, 18, 20) before operating the antifreeze mechanism (15, 16) (S15, S62).

10. (Currently Amended) The power plant as defined in ~~Claim 1 or~~ Claim [[2]] 9, wherein the power plant further comprises a fuel cell stack comprising an anode and a cathode, a condenser which condenses water vapor in cathode effluent discharged from the cathode, a water tank which recovers water condensed in the condenser, a humidifier which humidifies gas supplied to the anode, and a water passage which supplies water for humidification to the condenser from the water tank, the antifreeze mechanism comprises a drain which drains water from the water passage, and the ~~antifreeze mechanism (15, 16) comprises a drain valve [(15)]~~ which opens and closes the drain drains part of remaining water in the fuel cell power plant.

11. (Currently Amended) The power plant as defined in Claim [[10]] 1, wherein the power plant further antifreeze mechanism comprises a heater which heats part of the remaining water in the fuel cell power plant stack (1) comprising an anode (1A) and a cathode (1B), a condenser (8) which condenses water vapor in cathode effluent discharged from the cathode (1B), a water tank (10) which recovers water condensed in the condenser (8), a humidifier (4) which humidifies gas supplied to the anode (1A), and a water passage (9B) which supplies water for humidification to the condenser (8) from the water tank (10), the antifreeze mechanism (15, 16) comprises a drain (16) which drains water from the water passage (9B), and the drain valve (15) comprises a valve (15) which opens and closes the drain (16).

12. (Currently Amended) The power plant as defined in Claim 1 ~~or Claim 2~~, wherein the parameter comprises one of an outside air temperature and climactic data corresponding to a present location of the antifreeze mechanism (15, 16) comprises a heater (13) which heats part of the remaining water in the fuel cell power plant.

13. (Currently Amended) The power plant as defined in Claim 1 ~~or Claim 2~~, wherein the sensor comprises a sensor which detects a temperature outside the power plant as the parameter, and the controller is further programmed to calculate the freezing probability based on the outside air temperature parameter comprises one of an outside air temperature and climatic data corresponding to a present location of the power plant.

14. (Currently Amended) ~~The power plant as defined in Claim 2, wherein the sensor (2, 31) comprises a sensor (31) which detects a temperature outside the power plant as the parameter, and the controller (30) is further programmed to calculate the freezing probability based on the outside air temperature (S13, S52)~~ A fuel cell power plant which uses water for operation, comprising:

means for preventing freezing of water in the fuel cell power plant;

means for detecting a parameter for estimating a freezing probability of water in the fuel cell power plant after operation of the fuel cell power plant stops;

means for estimating the probability of water freezing in the fuel cell power plant after operation of the fuel cell power plant has stopped based on the parameter;

means for estimating a wait time from when the power plant has stopped operating based on the freezing probability; and

means for suspending operation of the antifreeze means until the wait time has elapsed from when the fuel cell power plant stops operating.

15. (Currently Amended) A freeze prevention method for a fuel cell power plant which uses water for operation and comprises an antifreeze mechanism (15, 16) for preventing freezing of water in the fuel cell power plant, the method comprising:

detecting a parameter for estimating a freezing probability of water in the fuel cell power plant after operation of the fuel cell power plant stops ~~[(S1)]~~;

estimating the probability of water freezing in the fuel cell power plant after operation of the fuel cell power plant has stopped based on the parameter ~~(S13, S52)~~;

estimating a wait time from when the power plant has stopped operating based on the freezing probability ~~(S16, S56)~~; and

suspending operation of the antifreeze mechanism until the wait time has elapsed from when the fuel cell power plant stops operating ~~(S18-S20, S55, S58-S61, S62, S63)~~.